

**COLORADO RIVER RECOVERY PROGRAM
FY-2004–2005 PROPOSED SCOPE OF WORK for:**

Project No.: C-6-bt/rz

Larval bonytail and razorback sucker survival in four sites

Lead Agency: U. S. Fish and Wildlife Service

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Category:

- ☐ Ongoing project
☒ Ongoing-revised project
☐ Request new project
☐ Unsolicited new project

Expected Funding Source:

- ☒ Annual funds
☐ Capital funds
☐ Other (explain)

I. Title of Proposal: **Determination of factors affecting survival and growth of stocked razorback sucker and bonytail in multiple floodplain wetlands of the middle Green River under reset conditions.**

II. Relationship to RIPRAP:

GREEN RIVER ACTION PLAN: MAINSTEM

II. Restore habitat

II.A. Restore and manage flooded bottomland habitat

II.A.3. Implement levee removal strategy at high-priority sites

II.A.3.d. Evaluation

III. Study Background/Rationale and Hypotheses:

No knowledge on the habitat use of larval and juvenile razorback sucker *Xyrauchen texanus* and bonytail *Gila elegans* exists prior to major physical and biological changes during the 20th century. Projects supported by the Recovery Implementation Program (RIP) have provided insight into the habitat needs of these fish, particularly the use of floodplains by juvenile fish. Age-1 razorback sucker grew and survived well in floodplains in the presence of large residual nonnative fish populations (Birchell and Christopherson in review; Birchell and Christopherson 2002). Data available indicate

that, given the opportunity to leave, age-I razorback sucker chose not to emigrate to the river until fish were greater than 300 mm, after which they readily moved into the river (USFWS unpublished telemetry data, Birchell and Christopherson in review; Modde et al. 2004). The biggest bottleneck in using floodplains to recover razorback sucker, and possibly bonytail, is the ability of larvae to survive in the presence of nonnative fishes. The earliest razorback sucker larval stocking in floodplains with nonnative fishes resulted in no survival (Birchell and Christopherson in review). However, the capture of juvenile razorback sucker in Old Charley Wash (Modde 1996), the Stirrup study in 2002 (Christopherson et al. in review), and 2003 results in Baser Bend study pens (Project C-6-rz-bt/UDWR) and multiple floodplains (Project C-6 rz-bt/FWS) further indicate that larval razorback sucker and bonytail can survive in the presence of nonnative fishes under specific circumstances, i.e., if floodplains are reset. Among the studies to date, only the latter approach provided information on larval survival under natural flooding conditions.

To date, RIP studies have documented larval razorback sucker and bonytail can survive in the presence of nonnative fishes, but only preliminary information exists on those conditions that result in the greatest opportunity for survival. With capital funding nearly gone, it is important to prioritize remaining dollars to the highest possible returns. The Green River floodplain management plan (Valdez 2003) identifies sixteen floodplain sites that can be managed as endangered fishes nursery habitat. The current study seeks to provide a solid base of information to prioritize sites for management, as well as define the potential for Thunder Ranch to contribute to recovery. Last years data from Project C-6-rz-bt/FWS demonstrated that larger sites with large quantities of submergent vegetation were more likely to have higher razorback sucker and bonytail survival. Given the resources that need to be committed to recovering razorback sucker, the preliminary results need to be replicated to avoid criticism that recovery actions are based on a weak data base. Another important component to the Green River floodplain management plan is Thunder Ranch, the first major wetland downstream of the primary razorback spawning bar. Although the Thunder Ranch floodplain easement is fairly large, only a portion of the floodplain maintains water during the base flow period. Thus, the contribution of Thunder Ranch floodplain needs to be evaluated to determine the potential of the existing floodplain environment is sufficient to meet recovery, or modifications will be needed to enhance the floodplain for endangered fish survival and carrying capacity.

IV. Study Goals, Objectives, End Product:

Goal: To increase survival and growth of larval and juvenile razorback sucker and bonytail in off-channel floodplain wetlands in the Green River using the reset concept to control nonnative fish impacts.

This scope of work expands the use of the 'reset' approach to a management scale that examines those wetlands where razorback sucker and bonytail larvae are most likely to survive, and includes the newly acquired Thunder Ranch easement property.

Objectives:

1. Determine first year growth and survival of stocked razorback sucker and bonytail larvae in large floodplain wetlands of the middle Green River under the 'reset' and partial 'reset' conditions.
2. Relate stocked razorback sucker and bonytail abundance to nonnative fish abundance and composition, temperature, turbidity, pH, dissolved oxygen, depth, size of wetland, type and vegetative cover.
3. Use larval survival and growth results to facilitate prioritizing wetland sites and management actions to maximize razorback sucker and bonytail recruitment..

End Product:

Draft report due to coordinator May 1, 2005; to peer reviewers and Biology Committee June 1, 2005; final draft to Biology Committee August 15, 2005.

V. Study Area:

The study area lies within the alluvial reach of the middle Green River. The specific study sites include Johnson Bottom (120 acres), Leota Bottom unit #10 (100 acres), Old Charley Wash (80 acres), and Thunder Ranch (50 acres). These sites are off-channel floodplain depressions that are located between river miles 305 and 258. Johnson, Leota, and Old Charley Wash are administered by the Ouray National Wildlife Refuge (FWS), and Thunder Ranch is accessible through an easement on private property. Spring flood waters in the Green River can access all floodplains between approximately 7,000 cfs (Johnson and Old Charley Wash, Leota) and 13,000 cfs (Thunder Ranch).

VI. Study Methods/Approach:

Data collection:

Razorback sucker will be requested to stock five impoundments at a rate of 1,000 larvae per acre (approximately 350,000 larvae) in the spring of 2004. Fish will be provided by Ouray National Fish Hatchery and the Grand Junction CRFP. Bonytail larvae from Dexter NFH&TC will be stocked into the same wetlands as razorback sucker larvae. A request for bonytail larvae from Dexter NFH&TC will be made to stock 750 larvae/acre (approximately 263,000 larvae). Razorback sucker and bonytail will be stocked as early as they are available and water is present in the floodplains. If only a portion of the wetlands are inundated, then the densities of razorback sucker and bonytail will be

increased and stocked into available wetlands.

Dissolved oxygen, pH, and temperature will be recorded hourly through a 24 period every week with a continuous recording device (hydrolab). In addition, recording thermometers will be placed in all floodplains. Turbidity will be measured once a week at the time hydrolab recorders begin recording, and depth will be monitored weekly. If water quality degrades in any impoundment, the hydrolab will be deployed in that site to document severe changes for correlation in the event of an eventual fish-kill. If floodplains begin to dry up such that water quality becomes a threat to survival of razorback sucker and bonytail, attempts will be made to capture fish from the threatened floodplains and fish will either be stocked directly into the Green River or be placed in available grow-out ponds (as determined by the Biology Committee).

Vegetation area will be monitored monthly in each floodplain wetland with aerial photography. Total area of the wetland will be determined using GPS equipment and percent area of dominant vegetation will be determined by planimetry. Dominant vegetation types will be identified (i.e., dominant submergent, emergent, flooded terrestrial, etc.) and the percent area from overhead aerial photographs will be determined.

Fish composition and size structure (length frequency) will be monitored in each wetland shortly after initial inundation to determine relative abundance and composition of nonnatives; in mid-summer to determine the relative abundance or absence of stocked fishes; and in late September or early October to determine abundance of stocked fish and fish composition in the wetland preceding the winter months. Each fish collection will be consist of five fyke nets set overnight at randomly assigned shoreline sites. Species, weight, and length (TL) of all fish captured will be recorded. During the last fish collection, mark-recapture efforts will be attempted in each wetland to determine the absolute abundance of razorback sucker and bonytail at the end of the first field season (sampling not to exceed five net nights). Relative abundance of non-stocked fish will be determined in the fall.

Data will be analyzed to determine how nonnative fish abundance and composition, temperature, dissolved oxygen, pH, turbidity, depth, size of wetland, type and vegetative cover are associated with greatest survival of both razorback sucker and bonytail in the wetlands studied. Results from the three large floodplains on the Ouray NWR will be compared with those from the Thunder Ranch floodplain. Razorback sucker and bonytail survival, growth and abundance (absolute or relative) will be regressed with environmental and biological parameters measured to identify causal relationships.

VII. Task Description and Schedule

Task 1. Monitor physical parameters of study wetlands

Task 2. Monitor fish composition in study wetlands.

Task 3. Analyze data and prepare annual and final reports.

Schedule FY-2004

Task 1	May 1- September 30, 2004
Task 2	May 1- September 30, 2004
Task 3	September 1- September 30, 2004

Task Description and Schedule FY-2005

Task 3	Draft report due to coordinator May 1, 2005; to peer reviewers and Biology Committee June 1, 2005; final draft to Biology Committee August 15, 2005.
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FY-2004 Work:

1. Deliverables/due dates: Annual Report December 2004
2. Budget:

Task 1.

Labor	\$5,700	(one GS-5 seasonal, 50 d (8hr) at \$114/d)
Supplies	1,200	(replacement nets and misc.)
Aerial Flights	1,000	(4 flights at \$250/flight)
Transportation	3,715	(GSA rental for 2 months at \$382/month; 165 miles/day x 55 days at 32.5 cents/mile)

Task 2

Labor	\$51,615	(4 GS-5 technicians, 42 days (9hr) at \$132/d; GS-9 42, days (9hr), at \$231/d, GS-13, 42 days (9hr) at \$470/d;
Transportation	1990	(GSA rental for one month at \$382/month, 165 miles/day x 30 days at 32.5 cents/mile)

Task 3.

<u>Labor</u>	<u>5,720</u>	<u>(GS-13, 13 d (8hr) at \$440/d)</u>
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Total	\$ 69,940
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FY-2005 Work:

1. Deliverables/due dates: Draft report due to coordinator May 1, 2005; to peer reviewers and Biology Committee June 1, 2005; final draft to Biology Committee August 15, 2005.

2. Budget:

Task 3.

Labor	22,000	(GS-13, 10 weeks at \$2,200/week)
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VIII. Budget Summary:

FY-2004	\$ 69,940*
FY-2005	\$ 22,000

* Does not include BR-FWS transfer overhead costs.

IX. Reviewers: Biology Committee

X. References:

Birchell, G.J., and K.D. Christopherson. 2002. A survey of non-native fish populations inhabiting selected floodplain wetlands and associated river reaches of the Green River, Utah. Pages 9.1-9.76, *in*, The levee removal project: Assessment of floodplain habitat restoration in the middle Green River. Final Report, Project CAP-6-LR, submitted to the Recovery Implementation Program for the Recovery of Endangered Fishes in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, CO.

Birchell, G.J., and K.D. Christopherson. in review. Survival, growth and recruitment of larval juvenile razorback suckers (*Xyrauchen texanus*) introduced into floodplain depressions of the Green River, Utah. Project C-6RZ, submitted to the Recovery Implementation Program for the Recovery of Endangered Fishes in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, CO.

Christopherson, K.D., G.J. Birchell, and T. Modde. in review. Evaluation of larval razorback sucker and bonytail chub survival in the Stirrup floodplain depression with nonnative fish species. Project C-6-rz-bt, submitted to the Recovery Implementation Program for the Recovery of Endangered Fishes in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, CO.

Modde, T. 1996. Juvenile razorback sucker (*Xyrauchen texanus*) in a managed wetland adjacent to the Green River. Great Basin Naturalist 56:375-376.

Modde, T., G.J. Birchell, and K.D. Christopherson. 2004. Comparison of the distribution and recapture rates of acclimated and non-acclimated razorback sucker *Xyrauchen texanus* stocked into the Green River. American Fisheries Society Symposium: in press.

Valdez, R.A. 2003. Green River Subbasin: floodplain management plan. Final Report submitted to the Recovery Implementation Program for the Recovery of Endangered Fishes in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, CO.